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MAR ATHANASIUS COLLEGE OF ENGINEERING, KOTHAMANGALAM

(Govt. Aided Autonomous Institution)

Second Semester B.Tech. Degree Examination, May, 2026

Course Code: B24EC1T04

Course Name: ANALOG CIRCUITS 1

Max. Marks: 100

Duration:3 Hours

PART - A: 30 Marks (10 Qns x 3 Marks)

Answer all questions

1. Explain the working of p-n junction diode under reverse bias condition.
2. Define static resistance of a diode. How can you find dynamic resistance?
3. Discuss 78XX voltage regulator with pinout diagram.
4. A high-value capacitor can reduce ripples in a full-wave rectifier. Justify.
5. Explain the significance of the load line in determining the operating point of a transistor.
6. Compare all three configurations of the transistor based on the following points. a) Input Resistance
b) Output Resistance c) Voltage gain
7. How does feedback affect the gain of an amplifier?
8. Define T model of BJT?
9. Describe the classification of oscillators based on the active components used.
10. What is the significance of "load capacitance" in a crystal oscillator, and how does it affect the frequency of oscillation?

PART - B: 70 Marks (5 Qns x 14 Marks)

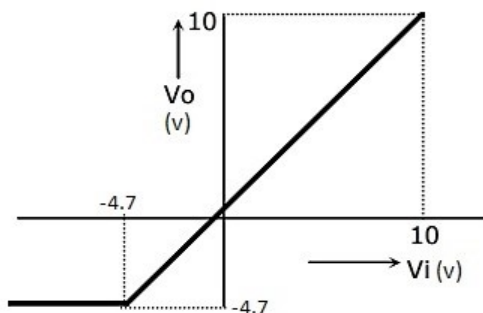
Answer any One full question from each module.

Module 1

11. Explain the working of an RC integrator circuit and the principle behind its operation. Also explain its response to different input waveform with diagrams.

OR

12. a) Using suitable circuit diagrams, compare and explain the operation of positive and negative clamping circuits. (7 Marks)
- b) Illustrate a silicon diode circuit that can achieve the given transfer characteristics and describe its operation. (7 Marks)



Module 2

13. a) Draw the block diagram of Series voltage regulators. (7 Marks)
- b) Explain the working of center tapped full wave rectifier with necessary diagrams. Also explain its PIV. (7 Marks)

OR

14. Draw the block diagram of an SMPS and explain its working in detail. Discuss how an SMPS achieves higher efficiency compared to linear regulators and mention its advantages and limitations.

Module 3

15. a). Describe the operation of a transistor with a neat diagram, indicating the current flow directions. (7 Marks)
- b) Draw the VI characteristics of BJT in CE configuration, explaining the regions of operation. (7 Marks)

OR

16. a) Explain the process of achieving bias stabilization using an emitter resistor and derive the stability factor for this configuration. (8 Marks)
- b) Derive the expression for the stability factor of a voltage-divider bias circuit. (6 Marks)

Module 4

17. a) Discuss about the effect of feedback with gain and bandwidth in amplifiers. (7 Marks)
- b) Explain the important parameters related to two-port system in detail with necessary diagrams. (7 Marks)

OR

18. Derive the voltage gain, input and output impedance of a voltage series feedback connection with an appropriate diagram.

Module 5

19. a) Detail the operational behavior of a Wien bridge oscillator and the principle behind its frequency of oscillation. (8 Marks)

- b) Define the concept of series and parallel resonance in quartz crystal. (6 Marks)

OR

20. a) What are the different classifications of oscillators? (7 Marks)

- b) With the neat circuit diagram, explain the working of Hartley oscillator. (7 Marks)
